

WHAT IS CLAIMED IS:

1. A metal comprising:  
a substrate with an exterior surface; and  
5 a protective biofilm positioned on said exterior surface that reduces corrosion of said exterior surface;  
wherein said metal is not steel, copper or aluminum.
2. The metal of Claim 1, wherein said metal is brass UNS-C26000.
3. The metal of Claim 1, wherein said biofilm is a bacterium.
4. The metal of Claim 3, wherein said bacterium is an aerobe.
- 15 5. The metal of Claim 4, wherein said bacterium is *Bacillus subtilis* or *Bacillus licheniformis*.
6. The metal of Claim 1, wherein said biofilm is between about 10  $\mu\text{m}$  and about 20  $\mu\text{m}$  thick.
- 20 7. A method for reducing metal corrosion comprising:  
providing a metal with an exterior surface;  
applying on said exterior surface a protective biofilm that reduces corrosion of said exterior surface;  
25 wherein said metal is not copper, aluminum or steel.
8. The method of Claim 7, wherein said providing step includes the step of providing a metal that is brass UNS-C26000.
- 30 9. The method of Claim 7, wherein said applying step includes the step of applying a protective biofilm that is a bacterium.

10. The method of Claim 9, wherein said applying step includes the step of applying a bacterium that is an aerobe.
11. The method of Claim 10, wherein said applying step includes the step of applying a bacterium that is *Bacillus subtilis* or *Bacillus licheniformis*.
12. The method of Claim 7, wherein said applying step includes the step of applying a protective biofilm that is between about 10  $\mu\text{m}$  and about 20  $\mu\text{m}$  thick.
13. The method of Claim 7, wherein said providing step includes the step of providing a metal that is immersed in a liquid.
14. The method of Claim 13, wherein said providing step includes the step of providing a metal that is immersed in artificial seawater or Luria-Bertani medium.
15. A metal comprising:  
a substrate with an exterior surface; and  
a protective biofilm positioned on said exterior surface that reduces corrosion of said exterior surface;  
wherein said protective biofilm is a bacterium that secretes a polyanionic chemical composition.
16. The metal of Claim 15, wherein said metal is selected from the group consisting of aluminum, aluminum alloy, copper, a copper alloy, titanium, a titanium alloy, nickel and a nickel alloy.
17. The metal of Claim 15, wherein said metal is steel.
18. The metal of Claim 17, wherein said steel is mild steel-1010.
19. The metal of Claim 15, wherein said bacterium is an aerobe.

20. The metal of Claim 19, wherein said bacterium is *E. coli*.
21. The metal of Claim 15, wherein said bacterium has been genetically engineered to secrete the polyanionic chemical composition.
- 5 22. The metal of Claim 15, wherein said polyanionic chemical composition is polyphosphate.
23. The metal of Claim 15, wherein said biofilm is between about 10  $\mu\text{m}$  and  
10 about 20  $\mu\text{m}$  thick.
24. A method for reducing corrosion comprising:  
providing a metal with an exterior surface;  
applying on said exterior surface a protective biofilm that reduces corrosion of  
15 said exterior surface;  
wherein said protective biofilm is a bacterium that secretes a polyanionic chemical composition.
25. The method of Claim 24, wherein said providing step includes the step of  
20 providing a metal that is selected from the group consisting of aluminum, a aluminum alloy, copper, copper alloy, titanium, a titanium alloy, nickel and a nickel alloy.
26. The method of Claim 24, wherein said providing step includes the step of  
25 providing a metal that is steel.
27. The method of Claim 26, wherein said providing step includes the step of  
providing a metal that is mild steel-1010.
28. The method of Claim 24, wherein said applying step includes the step of  
30 applying a bacterium that is an aerobe.

29. The method of Claim 28, wherein said applying step includes the step of applying a bacterium that is *E. coli*.

5 30. The method of Claim 24, wherein said applying step includes the step of applying a bacterium that has been genetically engineered to secrete the polyanionic chemical composition.

10 31. The method of Claim 24, wherein said applying step includes the step of applying a polyanionic chemical composition that is polyphosphate.

32. The method of Claim 24, wherein said applying step includes the step of applying a biofilm that is between about 10  $\mu\text{m}$  and about 20  $\mu\text{m}$  thick.

15 33. The method of Claim 24, wherein said providing step includes the step of providing a metal that is immersed in a liquid.

34. The method of Claim 24, wherein said providing step includes the step of providing a metal that is immersed in artificial seawater or Luria-Bertani medium.